Exemption No. 6893

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of

Bombardier Aerospace

for an exemption from § 25.1435(b)(1) of Title 14, Code of Federal Aviation Regulations

Regulatory Docket No. 29466

GRANT OF EXEMPTION

By letter of January 25, 1999, Mr. W. B. Remington, Chief Airworthiness Engineer, Bombardier Aerospace, Bombardier Inc., P.O. Box 6087, Station Centre-ville, Montreal, Quebec, Canada, H3C 3G9, petitioned for exemption from the static pressure test requirements of § 25.1435(b)(1) of Title 14, Code of Federal Aviation Regulations (14 CFR). The proposed exemption, if granted, would permit a range of motion test to be conducted at 3750 psig for the hydraulic system on the Bombardier Regional Jet Series 700, Model CL-600-2C10 airplane.

The petitioner requests relief from the following regulations:

> **Section 25.1435(b)(1)** states that a complete hydraulic system must be static tested to show that it can withstand 1.5 times the design operating pressure without a deformation of any part of the system that would prevent it from performing its intended function. Clearance between structural members and hydraulic system elements must be adequate, and there must be no permanent detrimental deformation. For the purpose of this test, the pressure relief valve may be made inoperable to permit application of the required pressure.

ANM-99-161-E

Related Section of the Federal Aviation Regulations (FAR):

Section 25.1435(a)(2) states that each element of the hydraulic system must be able to withstand, without rupture, the design operating pressure loads multiplied by a factor of 1.5, in combination with ultimate structural loads that can reasonably occur simultaneously. Design operating pressure is maximum normal operating pressure, excluding transient pressure.

The petitioner's supportive information is as follows:

In place of the static test (4500 psi), Bombardier proposes to conduct a dynamic, range of motion, test at the system relief pressure, 3750 psig, and component testing at 1.5 times operating pressure (4500 psi) per § 25.1435(a)(2).

Bombardier states that their "position is derived from the discussion of a Proposed Rule and Notice [Notice 96-6, Docket 28617, published in the Federal Register, Volume 61, No. 129, Pages 35055-35062, July 3, 1996] for FAR 25.1435(c)(3) - Hydraulic Systems Tests - which states that: 'The complete hydraulic systems must be functionally tested on the airplane in normal operation over the range of motion of all associated user systems. The test must be conducted at the system relief pressure or 1.25 times the design operating pressure if a system pressure relief device is not part of the system design. Clearance between hydraulic system elements and other systems or structural elements must remain adequate and there must be no detrimental effects.'

"In the reference proposed rule and notice [Docket No. 28167], the FAA proposed to replace the current FAR 25.1435(b)(1) with the proposed FAR 25.1435(c)(3) requirement. The proposed rule revises the current airplane static proof pressure test requirement to require a complete functional (dynamic) airplane test at a lower pressure."

“As part of Bombardier testing to demonstrate compliance with FAR 25.1309(b), Bombardier will conduct a dynamic test equivalent to the proposed FAR 25.1435(c)(3) to demonstrate systems operation following hydraulic pump compensator failure. The CL-600-2C10 hydraulic system design operating and the relief valve cracking pressures are 3000 and 3750 psi respectively. . . . Bombardier will use the new proposed Advisory Circular (AC) 25.1435-1 to ensure consistent interpretation and application of the proposed revised standard.”

“Bombardier Aerospace shares the FAA’s opinion, expressed in the reference NPRM [proposed rule and notice], that the proposed functional test more closely approximates actual operating conditions in which higher system pressures would be seen than in the

existing static test. This is because for the static test, several parts of the system and associated relief valves, including return lines, may need to be disabled to allow the system pressurization at 1.5 times the design operating pressure because the relief valves are designed to open at a pressure lower than the 1.5 times the design operating pressure.

"The CL-600-2C10 hydraulic system components, lines and installations are individually tested to 1.5 times the design operating pressure as part of their qualification tests and aircraft functional test procedures to satisfy the current FAR 25.1435(a)(2) requirement. However a complete hydraulic system is not planned to be tested in a single test as this requires extensive test preparation, unnecessary additional costs . . . and does not add to the level of safety to be demonstrated by the dynamic test proposed and static tests already being conducted on the CL-600-2C10."

Bombardier notes that a precedent exists in that a similar exemption was granted for The Bombardier Global express BD700-1A10, Exemption 6726, Regulatory Docket No. 29077.

In view of the substantiating factors/discussion detailed above, Bombardier asserts that the granting of this exemption with respect to testing a complete hydraulic system at 1.5 times operating pressure is in the public interest. Bombardier hereby petitions the FAA to grant the subject exemption because the proposed method of demonstrating compliance will provide a safe and reliable product. The complete hydraulic system proof pressure test required by § 25.1435(b)(1) is of no additional value and creates an unnecessary financial burden without adding to the level of safety.

A summary of the petition was published in the Federal Register on March 19, 1999 (64 FR 13627). No comments were received.

The Federal Aviation Administration's analysis/summary is as follows:

The FAA has carefully considered the information provided by the petitioner, and has determined that there is sufficient merit to warrant a grant of exemption.

Notice of Proposed Rulemaking, 96-6

The FAA concurs that the petitioner's proposed test is in compliance with the proposed harmonized rule change under consideration by the FAA and the Joint Aviation Authority (JAA).

Previously Granted Exemption for BD700-1A10

The FAA concurs that a precedent does exist based on the exemption granted for the Bombardier Global Express Model BD700-1A10.

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, delegated to me by the Administrator (14 CFR 11.53), Bombardier Inc. is hereby granted an exemption from 14 CFR § 25.1435(b)(1) to the extent necessary to permit type certification of the Bombardier Regional Jet series 700, Model CL-600-2C10 by conducting a range of motion test of the hydraulic system at 3750 psig (the system relief pressure) per the proposed § 25.1435(c)(3) and component testing at 1.5 times the operating pressure (4500 psig) per the current § 25.1435(a)(2). All test results pertinent to this exemption must be documented in a report and a copy provided to this office.

Issued in Renton, Washington, on May 7, 1999.

/s/ John J. Hickey
John J. Hickey
Acting Manager
Transport Airplane Directorate
Aircraft Certification Service, ANM-100